VEO and Olecranon Injuries in Overhead Athletes

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Disclosures

• Arthrex: Consultant
• DJO: Education
• Smith Nephew: Education
• American Journal of Sports Medicine
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• The Physician and Sports Medicine
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Back in the Day.....

• Bennett described a condition he termed “so-called osteochondritis of the professional pitchers’ elbow”:
  • “semi-detached bodies” by the medial epicondyle
  • Loose bodies in the olecranon fossa
  • Stated that “removal does away with all symptoms” *(Bennett, JAMA, 1941)*
• In 1969, King described the “Medial Stress Syndrome” of the elbow in 50 pro baseball players.

• Proposed that valgus/tension causes medial problems and compression leads to lateral pathology

(King, et al, CORR, 1969)
Valgus Extension Overload

- Posterior medial pain at follow through
- Reproduced on exam by forced extension and valgus
- May be related to UCL insufficiency
- Synovitis, chondromalacia, loose bodies and osteophytes
Ulnohumeral chondral and ligamentous overload: biomechanical correlation for posteromedial chondromalacia of the elbow in throwing athletes.

Osbahr DC¹, Dines JS, Breazeale NM, Deng XH, Altchek DW

Increased contact pressure (shifted medially) and decreased contact area in UCL insufficient specimens

Abnormal contact may occur as a result of valgus laxity through increased contact pressures across the posteromedial elbow

Concluded that valgus laxity throughout the throwing motion may lead to chondromalacia
VEO Treatment

• Initial treatment includes short period of rest, NSAIDS, possibly injection

• Arthroscopic debridement with osteophyte and loose body removal may be needed

• Loose bodies, osteophytes often return after 2-3 seasons

• Many veteran athletes have had several “clean-outs” during their career
Elbow Arthroscopy Set-up
Basic Elbow Arthroscopy Principles

• Outline bony landmarks and ulnar nerve
• Distend the joint with saline
• Keep elbow flexed 90 degrees
• Incise skin only
• Spread with hemostat
• Only use blunt trocars
• Be careful with pumps; low pressure and flow are best
Posterior Compartment Debridement

✓ Remove loose bodies
✓ Perform synovectomy
✓ Excise olecranon tip spur
Medial Collateral Ligament Strain with Partial Posteromedial Olecranon Resection

A Biomechanical Study

By Srinath Kamineni, MD, FRCS(T+Orth), Neal S. ElAttrache, MD, Shawn W. O’Driscoll, MD, PhD, Christopher S. Ahmad, MD, Hirotsume Hirohara, MD, Patricia G. Neale, MS, Kai-Nan An, PhD, and Bernard F. Morrey, MD

Investigation performed at the Department of Orthopedic Biomechanics, Mayo Clinic, Rochester, Minnesota

- Measured MUCL strain with increasing amounts of bone resection
- Determined that resection should not include native bone (remove spur only)
Outcome of Elbow Surgery in Professional Baseball Players

James R. Andrews,† MD, and Laura A. Timmerman, MD

From the American Sports Medicine Institute, Birmingham, Alabama

14% reoperation rate for arthroscopic debridement group (VEO)

Better results with UCL reconstruction

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Study group (N = 59)</th>
<th>Return to play</th>
<th>Reoperation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debridement of posterior olecranon osteophyte</td>
<td>41</td>
<td>34 (58)</td>
<td>23 (68)</td>
</tr>
<tr>
<td>UCL reconstruction</td>
<td>12</td>
<td>7 (16)</td>
<td>0</td>
</tr>
<tr>
<td>UCL repair</td>
<td>2</td>
<td>2 (3)</td>
<td>0</td>
</tr>
<tr>
<td>Ulnar nerve transfer and olecranon osteophyte</td>
<td>9</td>
<td>7 (12)</td>
<td>6 (86)</td>
</tr>
<tr>
<td>Ulnar nerve transfer</td>
<td>2</td>
<td>1 (2)</td>
<td>1 (100)</td>
</tr>
<tr>
<td>Debridement of capitellum</td>
<td>1</td>
<td>1 (1)</td>
<td>1 (100)</td>
</tr>
<tr>
<td>Diagnostic arthroscopy*</td>
<td>5</td>
<td>5 (8)</td>
<td>5 (100)</td>
</tr>
</tbody>
</table>

* 4 UCL injuries and 1 posterior olecranon osteophyte.
Valgus extension overload syndrome in adolescent baseball players: clinical characteristics and surgical outcomes.

Park JY¹, Yoo HY², Chung SW³, Lee SJ³, Kim NR³, Ki SY³, Oh KS⁴

13 male adolescent baseball players (mean age, 15.4 years)

The overall rate of return to play was 85% (11 of 13). Concomitant ulnar collateral ligament insufficiency had less optimal outcomes
Stress Injury of the Proximal Ulna in Professional Baseball Players

Mark S. Schickendantz,*† MD, Charles P. Ho,‡ MD, PhD, and Jason Koh,§ MD

Figure 1. Mild stress reaction injury of the olecranon. Coronal fat suppression STIR image shows mild, poorly defined high-intensity signal edema (arrow) along the posteromedial superior aspect of the olecranon in a left-handed pitcher. The surrounding black is normal fatty marrow.

Figure 2. Prominent stress reaction injury of the olecranon. Coronal fat suppression STIR image shows very extensive high-intensity signal bone edema (arrow) throughout the proximal ulna in a right-handed pitcher.
Olecranon Stress Injury

- Relatively uncommon
- Posteromedial pain during acceleration and follow through
- Gradual onset
- Results from tensile failure of proximal medial ulna trabecular bone
- XR wnl
Olecranon Stress Injury

- Differentiate from MCL sprain by:
  - Pain, tenderness of olecranon proximal and dorsal to MUCL (posteromedial corner)
  - May have pain with percussion of olecranon

- MRI very helpful; ligament intact

- My opinion:
  - UCL laxity allows for shear across posterior medial joint leading to VEO; intact ligament results in constant stress on the ulna leading to *trabecular failure*
Olecranon Stress Injury

- Non-operative treatment effective if no fracture line
- True bi-cortical fracture requires rigid fixation
- Rest (orthotic?); avoid hyperextension and valgus stress while healing
- Consider bone growth stimulator
- Return to throwing based upon clinical response; majority return to play by 3 months
- Repeat MRI not absolutely indicated but may be helpful in some cases
Olecranon Apophysis Fracture

- Immediate severe posterior pain during follow through of throw
Classification of Olecranon Stress Fractures in Baseball Players

Kozo Furushima,*† MD, PhD, Yoshiyasu Itoh,† MD, PhD, Shohei Iwabu,† MD, PhD, Yuzuru Yamamoto,† MD, PhD, Ryuji Koga,† MD, and Masaki Shimizu,† MD, PhD
Investigation performed at the Sports Medical Center, Keiyu Orthopaedic Hospital, Gunma, Japan

- 200 baseball players age 13-27
- 71-90% associated MUCL sprain or medial epicondyle avulsion
- Classification system based on fracture location and pattern; correlates with age
Fixation Options

- Cannulated screw(s) +/- washer
- Single “home run” screw
- Tension band
  - Wire
  - Suture
- Plate and screws
Cannulated Screw Fixation of Refractory Olecranon Stress Fractures With and Without Associated Injuries Allows a Return to Baseball

James M. Paci,† MD, Jeffrey R. Dugas,‡ MD, Jeffrey A. Guy,§ MD, E. Lyle Cain Jr,‡ MD, Glenn S. Fleisig,‡ PhD, Candice Hurst,‡ MPH, Kevin E. Wilk,† PT, DPT, and James R. Andrews,‡ MD

Investigation performed at the American Sports Medicine Institute, Birmingham, Alabama

- 25 ORIF; 18 min 2 yr f/u; phone
- 17 RTP same or higher level; mean 29 w postop
- 10 athletes (56%) underwent 13 more surgeries; 7 not related to index procedure
- 6 (33%) hardware removal; 2 for infection
- This is not a benign injury or “slam dunk” fix!
Professional baseball players who undergo ORIF of an olecranon fracture (acute, displaced, or stress) have an RTS rate of 67.5% (57.6% to the same or higher level), which is no different from natural attrition among matched controls.

No decline in performance metrics was seen among players who were able to RTS when compared with their preoperative performance or the performance of matched controls.
Final Thoughts

• Posterior medial pain in the thrower’s elbow often arises from the joint/osseous structures

• Non-mechanical symptoms are safe to manage through a season

• Limit bone resection to osteophyte removal

• UCL insufficiency may play a role; always consider it

• Aggressively treat fractures with solid fixation/AO principles
Thank You!

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